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A Descriptive Study to Assess the Knowledge Regarding Malnutrition among the Mothers of Under Five Children Attending Primary Health Center at Bettahalsur, Bangalore

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ABSTRACT

Background:

Malnutrition remains a significant public health concern among under-five children, particularly in developing countries like India. Maternal knowledge plays a critical role in the prevention and management of malnutrition during early childhood.

Objectives:

The study aimed

1. To assess the knowledge regarding malnutrition among the mothers of under five children attending Primary Health Center at Bettahalsur, Bangalore.

2. To find an association between socio-demographic factors and knowledge regarding Malnutrition among mothers of under 5 children.

Methods:

A descriptive study was conducted among 100 mothers of under-five children. The Mothers of under five children were selected by non-probability convenient sampling technique and were interviewed using a structured and expert-validated knowledge questionnaire. In this study, data was collected using a structured interview schedule. Descriptive statistics (frequency, percentage, mean) and inferential statistics (chi-square test) were employed for data analysis.

Results:

The findings revealed that 50% of mothers had moderately adequate knowledge regarding malnutrition, 35% had adequate knowledge, and 15% had little or no knowledge. Significant associations were found between knowledge levels and the age of the mother ($p = 0.001$), religion ($p = 0.016$), educational qualification ($p = 0.013$), occupation ($p = 0.042$), family income ($p = 0.014$). No significant association was observed with family type, place of residence, or dietary pattern.

Conclusion:

The study highlights a moderate level of knowledge regarding malnutrition among mothers, with socio-demographic factors such as the mother's age, religion, educational status, occupation, and monthly income influencing knowledge levels. The findings suggest the need for targeted health education programs to bridge the knowledge gaps and promote better child health outcomes.

Keywords: Malnutrition, Under-five children, Maternal knowledge, Socio-demographic factors, Primary Health Center (PHC).

Introduction

"Malnutrition is not a condition affecting only the poor, it cuts across all social-economic groups across India." (1)

Nutrition is a significant determinant of good health and the incidence of mal- and under- nutrition in the community affects certain indicators such as Infant Mortality Rate (IMR) and Maternal Mortality Rate (MMR) adversely. [2]

Good nourishment is the right of every child, and the state must ensure proper nutrition for all children. Early childhood, that is the first six years constitutes the most crucial period in life, when the foundations are laid for cognitive, social, emotional language, and physical development. The young child under 3 years is most vulnerable to the vicious cycles of malnutrition, disease/ infection and resultant disability all of which influence the present condition of a child at micro level and the future human resource development of the nation at the macro level. [3]

According to UNICEF: Stunting, or low height for age, is caused by long-term insufficient nutrient intake and frequent infections. Stunting generally occurs before age two, and effects are largely irreversible. These include delayed motor development, impaired cognitive function and poor school performance. Nearly one third of children under five in the developing world are stunted. Wasting, or low weight for height, is a strong predictor of mortality among children under five. It is usually the result of acute significant food shortage and/or disease. [4]

Nutrition is important to ensure proper brain formation and development, which starts in the womb: development of the brain goes on during early childhood. Evidence suggests that children who are stunted often enroll late in school, complete fewer grades and perform less well in school. This, in turn, affects their creativity and productivity in later life. A low-birth weight baby, who is stunted and underweight in its infancy and gains weight rapidly in childhood and adult life, is much more prone to chronic conditions such as cardiovascular disease and diabetes.

The causes for malnutrition are various and are multidimensional which include: poverty, purchasing power, health care, ignorance on nutrition and health education, female illiteracy, social convention, Household food insecurity, illiteracy specially in women, Poor access to health services Lack of availability of safe drinking water, Poor sanitation and environmental conditions and low purchasing power, Early marriages of girls, Teenage pregnancies resulting in low birth weight of the newborns, Poor breastfeeding practices, Poor complementary feeding practices, Ignorance about nutritional needs of infants and young children and repeated infections further aggravate the situation. Number of other factors such as environmental, geographical, agricultural, and cultural factors have contributive effects resulting in malnutrition. Therefore, it is widely recognized that a multi-sectoral approach is necessary to tackle the problem of malnutrition.

The Consequences of malnutrition: Undernourished children have significantly lower chances of survival than children who are well-nourished. They are much more prone to serious infections and to die from common childhood illnesses such as diarrhoea, measles, malaria, pneumonia, and HIV and AIDS. The risk of dying increases with the severity of the under-nutrition. For instance, a child suffering from severe acute malnutrition is nine times more likely to die than children who are not undernourished. [5]

Need of the Study

Despite rapid economic development along with increase in food production in recent decades and several nutritional intervention programmes in operation since the last three decades, childhood under-nutrition remains an important public health problem in India. It is one of the important reasons for ill health and child mortality. [7]

Malnutrition is one of the most serious human health and social problems that affect vast areas of the world, much more prevalent and endemic in developing and under-developed countries. Under-nutrition is widely recognized as a major health problem in the developing countries of the world. Severe Protein Energy Malnutrition (PEM), often associated with infection contributes to high infant mortality in unprivileged communities. [6]

The consequences of child malnutrition for infant morbidity and mortality are enormous and there is an adverse impact of malnutrition on productivity so that a failure to combat child malnutrition reduces potential economic growth at the macro level. At the micro level, malnutrition both protein energy malnutrition and micronutrient deficiencies directly affect children's physical and cognitive growth and increases susceptibility to infection and diseases. The golden interval for intervention is believed to be from pregnancy to 2 years of age. After which under-nutrition may cause irreversible damage for future development. Poor fetal growth or stunting in the first two years of life leads to irreversible damage. Inadequate cognitive or social stimulation in first two to three years has lifelong negative impact on educational performance and psycho-social functioning. [8]

As per the recent report of NFHS-5 (2019-21), the nutrition indicators for children under 5 years have improved as compared with NFHS-4 (2015-16). Stunting has reduced from 38.4% to 35.5%, Wasting has reduced from 21.0% to 19.3% and Underweight prevalence has reduced from 35.8% to 32.1%. [9]

The UNICEF, WHO and the World Bank inter-agency team update the joint global and regional estimates of malnutrition among children under 5 years every other year.

The Joint Child Malnutrition Estimates (JME) released in 2023 reveal insufficient progress to reach the 2025 World Health Assembly (WHA) global nutrition targets and SDG target 2.2. Only about one third of all countries are ‘on track’ to halve the number of children affected by stunting by 2030, and assessment of progress to date not being possible for about one quarter of countries. Even fewer countries are expected to achieve the 2030 target of 3% prevalence for overweight, with just 1 in 6 countries currently ‘on track’. Further, an assessment of progress towards the wasting target is not possible for nearly half of countries.

More intensive efforts are required if the world is to achieve the global target of reducing the number of children with stunting to 89 million by 2030. With current progress, the 2030 target will be missed by 39.6 million children, with more than 80 per cent of these ‘missed’ children in Africa. Gaps in

the availability of data in some regions makes it challenging to accurately assess progress towards global targets. Regular data collection is therefore critical for monitoring and reporting on country, regional and global progress on child malnutrition.

According to JME – 2023, most children with malnutrition live in Africa and Asia (specifically Southern Asia). In 2022, more than half of all children under 5 affected by stunting lived in Asia and two out of five lived in Africa (Asia 52% Africa 43%). In 2022, almost half of all children under 5 affected by overweight lived in Asia and more than one quarter lived in Africa (Asia 48% Africa 28%). In 2022, 70 per cent of all children under 5 affected by wasting lived in Asia and more than one quarter lived in Africa (Asia 70% Africa 27%). [(10)]

By the above data and findings, we can see that according to UNICEF-WHO-The World Bank: Joint Child Malnutrition Estimates (JME) – 2023 (Published on May 18, 2023), most children with malnutrition live in Africa and Asia (specifically Southern Asia).

And also, according to UNICEF (2023): State of the World's Children Report, India continues to bear a disproportionate burden of undernutrition, with nearly one in three children under five suffering from stunting and one in five from wasting. This condition is not merely a result of food insecurity but is deeply rooted in sociocultural practices, maternal education, feeding behaviours, and access to health information and services. [(11)]

The following are further more reasons to conclude the need of the study,

1. Critical Role of Maternal Knowledge:

Multiple studies have demonstrated that maternal knowledge of nutrition and child-feeding practices is directly correlated with the nutritional status of children. Poor understanding of exclusive breastfeeding, delayed initiation of complementary feeding, and incorrect dietary practices are significant contributors to malnutrition in early childhood. A systematic review by Prasetyo et al. (2023) [(12)] revealed that maternal nutrition education significantly improved knowledge and positively influenced children's nutritional indicators.

Despite several national initiatives like POSHAN Abhiyaan, ICDS, and Janani Suraksha Yojana, knowledge gaps persist, especially in rural and primary care settings. This highlights the need for localized and targeted assessments to identify these knowledge gaps among mothers who directly influence child health outcomes. [(12)]

2. Underserved Context: Primary Health Centers (PHCs):

Primary Health Centers serve as the first point of contact for maternal and child healthcare in India, especially for rural and semi-urban populations. However, very few studies have been conducted at the PHC level to assess the depth of maternal understanding of malnutrition. Mothers visiting PHCs may not receive consistent or comprehensive nutrition counseling, making this population a critical focus group for preventive health education.

Conducting this study in a PHC setting will not only capture grassroots-level insights but will also provide a foundation for designing evidence-based, community-specific interventions.

3. Socio-Demographic Influences on Knowledge:

Research suggests that factors such as maternal education level, income, parity, and area of residence significantly influence a mother's awareness and health-seeking behavior. Studies by Devi (2024) [(13)] and Patali et al. (2018) [(14)] affirm that mothers with higher educational attainment and better economic status tend to have improved knowledge and practices related to nutrition. However, these findings are not uniform across different regions, indicating the need for localized data.

Understanding these associations in the PHC context can help healthcare providers tailor health messages and interventions for different socio-demographic groups, thereby improving maternal engagement and child health outcomes.

4. Persistent Knowledge-Practice Gap:

Another area of concern highlighted in recent literature (e.g., the Namibia study, 2023) [(15)] is the disconnect between knowledge and actual practice. Even when mothers are aware of correct feeding practices, many fail to implement them due to cultural beliefs, workload, or lack of support. This reinforces the need for behaviorally informed health communication strategies that go beyond awareness and focus on empowering and enabling mothers.

5. Need for Structured Assessments and Interventions:

Although numerous health programs address malnutrition, structured assessments of maternal knowledge using validated tools are limited, especially in primary care. This study intends to bridge that gap by offering quantitative insights into knowledge levels and their socio-demographic determinants, forming a strong basis for designing integrated health education modules that can be implemented through PHC systems.

Conclusion of Need

In light of the above, we can conclude that Mothers, as the primary caregivers, play a crucial role in the nutritional status of their children. Their knowledge regarding nutrition, breastfeeding practices, complementary feeding, hygiene, and health-seeking behaviour greatly influences the growth and development of children. However, in many rural and semi-urban areas, mothers often lack adequate knowledge about proper child nutrition, which contributes to the persistence of malnutrition.

While several studies have examined malnutrition at national and state levels, there is a scarcity of location-specific research that focuses on the knowledge of mothers in peri-urban or semi-urban areas like Bettahalsur, Bangalore - regions that often fall between rural neglect and urban outreach. Most existing literature centers on either rural or urban populations, leaving a notable gap in understanding the nutritional awareness among mothers in transitional communities, where access to healthcare, education, and public health information may be inconsistent.

Hence, this study is not only relevant but essential. It aligns with national priorities for reducing childhood malnutrition and strengthening maternal health education. The findings will be vital in guiding healthcare workers, policymakers, and program developers in tailoring health interventions to improve child health outcomes at the community level.

Methodology

RESEARCH APPROACH

A research approach is a systematic framework guiding the overall method of inquiry in a research study. Considering the nature and objectives of the current study — to assess the knowledge regarding malnutrition among the mothers of under five children attending Primary Health Center at Bettahalsur, Bangalore — a **survey research approach** was identified as most suitable.

RESEARCH DESIGN

A research design constitutes the structured blueprint or overall strategy that guides the process of collecting, analysing, and interpreting data to answer the research questions or validate hypotheses.

In this study, a **descriptive research design** was employed. The descriptive design is particularly relevant for systematically capturing, organizing, and presenting detailed information about the variables under investigation—in this case, the knowledge regarding malnutrition among the mothers of under five children.

VARIABLE

Variables are attributes or characteristics of a person, object, or concept that vary, assuming different measurable values. They represent specific aspects of the phenomenon under investigation and are critical for testing hypotheses and addressing research questions clearly and systematically.

☛ **Research variable**

1. **Research variable:** Knowledge regarding malnutrition among the mothers of under five children.

2. **Demographic Variables**: Age, Education, Occupation, Type of Family, Family Income, Area of Residence.

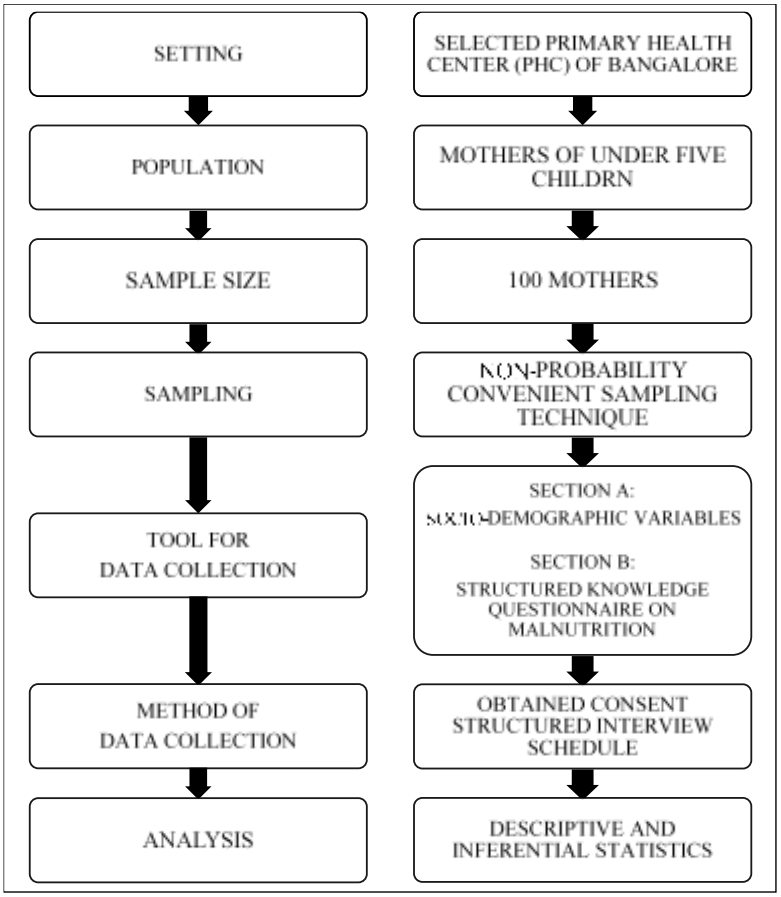

Figure 1: Schematic Representation of Research Design

SAMPLE SIZE

The study's **sample** included a total of **100** mothers of under 5 children attending Primary Health Center at Bettahalsur, Bangalore.

Sampling Technique

The process of sampling makes it possible to draw valid inferences for generalization of the results. Homogeneity of the sample was maintained by specifying inclusion and exclusion criteria for the selection of samples. ***Non-probability convenient sampling technique*** was found suitable for this study.

CRITERIA FOR SELECTION OF SAMPLE

- Inclusion criteria:
    - Mothers of under 5 children,
        - who were available during the period of data collection
        - who were willing to participate in this study
        - who were able to read and understand Kannada or English
- Exclusion criteria

Mothers of under 5 children:

- not willing to participate in the study.
- having more than 5 years children.

SCORING AND INTERPRETATION

Section A (Demographic Variables):

Responses collected were systematically coded to facilitate statistical analysis and interpretation.

Section B (Structured Knowledge Questionnaire):

Scoring was carried out as follows:

- Each correct response was assigned a score of 'one' (1)
- Each incorrect response was assigned a score of 'zero' (0)

The total possible score was 22. Respondents' knowledge level was categorized based on their total scores into three groups:

Table 1: Scoring Range and Level of Knowledge

Level of Knowledge	**Score**	**Percentage of Correct Answers**
Adequate Knowledge	17-22	Above 75%
Moderately Adequate Knowledge	12-16	50% to 75%
Inadequate Knowledge	0-11	Below 50%

Sociodemographic variables of the mothers of under 5 children

Table 2: Sociodemographic variables of the mothers of under 5 children

[n = 100]

Variable		**Frequency**	**Percentage (%)**
Age of the child	≤ 1 year	15	15
	1year 1month – 2 years	31	31
	2years 1month – 3 years	22	22
	3years 1month – 4 years	31	31
	4years 1month – 5 years	1	1
Gender of the child	Male	61	61
	Female	39	39
Age of the mother	≤ 20 years	10	10
	21-25	20	20
	26-30	64	64
	31-35	6	6
Religion	Hindu	86	86
	Muslim	12	12
	Christian	2	2
Educational Status of the mother	No Formal Education (but able to read and understand)	1	1
	Primary Education	1	1
	Secondary Education	7	7
	Higher secondary	32	32
	PUC/Diploma	43	43
	Graduation	15	15
	Post Graduation	1	1

Occupation	Home Maker	79	79
	Self Employed	7	7
	Government Employee	6	6
	Private Employee	8	8
Type of Family	Nuclear	85	85
	Joint	7	7
	Extended Family	8	8
Monthly Income	Less than 10000	8	8
	10001-20000	30	30
	20001-30000	39	39
	Above 30001	23	23
Place of Residence	Rural	81	81
	Urban	16	16
	Semi-Urban	3	3
Dietary Pattern	Vegetarian	15	15
	Non-Vegetarian	1	1
	Mixed	84	84
History of consanguineous marriage	No	91	91
	Yes	9	9
Total number of children in the family	1	60	60
	2	36	36
	3 or more	4	4
Birth interval (space) between two children	≤ 2 Years	50	50
	2-3 years	42	42
	> 3 years	8	8
Duration of breastfeeding of the child	Upto 6 months	13	13
	7 months – 1 year	52	52
	1year 1month - 1year 6months	22	22
	1 year 7 months – 2 years	13	13
Was the child preterm baby?	No	91	91
	Yes	9	9
Birth weight of the child	< 2.5 kg	9	9
	2.5 – 3.0 kg	67	67
	3.1 – 3.5 kg	18	18
	> 3.5 kg	6	6

Figure 2: Frequency and Percentage distribution of respondents according to Level of Knowledge among mothers of Under 5 children on malnutrition

Figure 2 categorizes respondents based on their level of malnutrition knowledge into three distinct groups: **Inadequate Knowledge**, **Moderately Adequate Knowledge**, and **Adequate Knowledge**.

The overall distribution clearly reveals a significant gap in knowledge regarding malnutrition among mothers of under-five children. While half of the participants fall into the moderately adequate category, only one-third have adequate knowledge, and 15% remain severely uninformed.

Given that mothers are the **primary caregivers**, their understanding of malnutrition directly affects the nutritional status and overall health of their children. The fact that a **majority (65%) have only moderately adequate or inadequate knowledge** emphasizes an urgent need for **targeted health education** and awareness programs.

These findings highlight the **relevance and importance** of this study, as it identifies not only the **existence of knowledge gaps** but also lays the foundation for **interventions** that can improve child health outcomes at the community level. Enhancing knowledge across these groups through tailored education strategies could significantly improve maternal and infant health outcomes.

Table 3: Frequency and Percentage Distribution regarding Level of Knowledge of mothers of under 5 children

n = 100

Sl. No.	Level of Knowledge	Score	Frequency	Percentage
1.	Inadequate Knowledge (<50%)	0-11	15	15
2.	Moderately Adequate Knowledge (51-75%)	12-16	50	50
3.	Adequate Knowledge (>75%)	17-22	35	35

Table 3 presents the frequency and percentage distribution of the level of knowledge regarding malnutrition among mothers of under-five children. Out of 100 participants, 15% of the mothers were found to have inadequate knowledge (scoring below 50%), indicating a significant gap in awareness about malnutrition and its consequences. Half of the mothers (50%) within the surveyed population demonstrated Moderately Adequate Knowledge (scoring between 51% and 75%), suggesting a limited understanding of the topic. Only **one-third of the mothers** (35%) were categorized as having adequate knowledge (scoring above 75%). These findings highlight the urgent need for targeted educational interventions and community-based awareness programs to enhance maternal knowledge on malnutrition, which is crucial for improving child health and nutrition outcomes.

Table 4: Mean and Standard Deviation of Level of Knowledge among Mothers of Under-Five Children

n = 100

	Mean	SD
Knowledge score	15.06	**± 6.94**

Table 4 shows that the average knowledge score among mothers of under-5 children was **15.06**, indicating a **moderate overall understanding** of the subject. The **standard deviation of 6.94** suggests a **moderate level of variation** in the knowledge scores among the participants.

Table 5: Association of level of knowledge with selected socio-demographic variables

N = 100

Sl. No.	Socio-demographic variables	Inadequate Knowledge	Moderately Adequate Knowledge	Adequate Knowledge	Chi-square value (χ^2)	P value
1.	**Age of the mother**					
	≤ 20 years	0	2	8	**21.789**	**0.001**
	21-25	7	8	5	**df = 6**	**S**
	26-30	8	34	22		
	31-35	0	6	0		
2.	**Religion**					
	Hindu	9	43	34	**12.145**	**0.016**
	Muslim	5	6	1	**df = 4**	**S**

	Christian	1	1	0		
3.	**Educational Status**					
	No Formal Education	1	0	0	**25.311**	**0.013**
	Primary Education	0	0	1	**df = 12**	**S**
	Secondary Education	0	4	3		
	Higher Secondary	9	19	4		
	PUC/Diploma	5	21	17		
	Graduation	0	6	9		
	Post Graduation	0	0	1		
4.	**Occupation**					
	Home Maker	14	44	21	**13.075**	**0.042**
	Self Employed	1	1	5	**df = 6**	**S**
	Government Employee	0	2	4		
	Private Employee	0	3	5		
5.	**Monthly Income**					
	Less than 10000	0	2	6	**15.94**	**0.014**
	10001-20000	8	12	10	**df = 6**	**S**
	20001-30000	6	25	8		
	Above 30001	1	11	11		
6.	**Type of family**					
	Nuclear	13	39	33	6.757	0.149
	Joint	0	5	2	df = 4	NS
	Extended Family	2	6	0		
7.	**Place of Residence**					
	Rural	14	37	30	3.698	0.448
	Urban	1	11	4	df = 4	NS
	Semi-Urban	0	2	1		

P < 0.05 (NS: Not Significant)

Table 5: Chi-Square Value, Degree of Freedom, and p-Value of the Responses

(N = 100) for our research work:

The Chi-square test was used to assess the association between selected sociodemographic variables and the responses of the mothers of under-five children. The analysis revealed the following:

- The variable **age of the mother** showed a statistically significant association with the responses

  ($\chi^2 = 21.789$, $df = 6$, $p = 0.001$), indicating a significant relationship.

- The **religion** of the mother also showed significant association

  ($\chi^2 = 12.145$, $df = 4$, $p = 0.016$).

- A statistically significant association was also found with **educational qualification**

  ($\chi^2 = 25.311$, $df = 12$, $p = 0.013$), suggesting that the education level of the mother had a significant impact on their responses.

- The variable **occupation** of the mother was also significantly associated

  ($\chi^2 = 13.075$, $df = 6$, $p = 0.042$).

- However, **monthly income** also demonstrated a significant association with the responses

  ($\chi^2 = 15.94$, $df = 6$, $p = 0.014$), indicating income levels may influence maternal responses.

- The **type of family** also did not show any statistically significant association

  ($\chi^2 = 6.757$, $df = 4$, $p = 0.149$).

- Lastly, the **area of residence** did not show any significant association

  ($\chi^2 = 3.698$, $df = 4$, $p = 0.448$), where rural, semi-urban, or urban living conditions appeared to have no effect on mothers' responses.

In summary, age, religion, educational qualification, occupation, and monthly income were found to have statistically significant associations with the responses of mothers of under-five children. Other variables, such as family type and place of residence, were not significantly associated.

Discussion

The present study was conducted to assess the sociodemographic profile and knowledge levels among the mothers of under-five children. Data were collected from 100 mothers, and findings were analyzed using descriptive statistics, chi-square tests, and frequency distribution charts. The results are discussed in relation to existing literature as follows:

The study revealed that the majority of children were aged between *1 year and 1 month - 2 years* (31%) and between *3 years and 1 month - 4 years* (31%). Following that, 22% were in the age range of *2 years and 1 month - 3 years*, 15% were aged ≤ *1 year*, and only 1% were between *4 years and 1 month - 5 years*. The surveyed population consisted of a higher percentage of male children (61%) compared to females (39%).

Most mothers identified as Hindus (86%), followed by Muslims (12%) and Christians (2%). In terms of educational qualifications, 32% had completed Higher Secondary education, 43% had finished PUC/Diploma, 15% were graduates, 1% were postgraduates, and 7% had completed Secondary education. Only 1% had no formal education but were able to read and understand, and another 1% had completed Primary education.

Regarding occupation, the majority of respondents were homemakers (79%), while 8% were private employees, 6% were government employees, and 7% were self-employed. Most respondents lived in nuclear families (85%), while 8% were from extended families and 7% were in joint families. Regarding monthly income, 39% earned between ₹20,001 and ₹30,000, 30% earned between ₹10,001 and ₹20,000, and a notable 23% earned above ₹30,001. When it comes to residence, 81% lived in rural areas, indicating a rural bias in the study population.

The dietary patterns revealed that 84% followed a mixed diet, 15% adhered to a vegetarian diet, and only 1% had a non-vegetarian diet. Instances of consanguineous marriage were rare, occurring in only 9% of cases.

In terms of birth weight, 67% of children weighed between 2.5 kg and 3.0 kg, 18% weighed between 3.1 kg and 3.5 kg, 6% weighed more than 3.5 kg, and 9% weighed less than 2.5 kg. Additionally, 9% of the children were preterm.

Similar demographic trends were reported by Sharma et al. (2021), who found that higher education levels and mixed dietary patterns were dominant among their study population. Urbanization and increased female education levels have been linked to changes in child-rearing practices and health awareness.

The chi-square test was applied to examine the association between selected sociodemographic variables and maternal knowledge levels. Significant associations were observed for:

Age of the mother ($\chi^2 = 21.789$, $p = 0.001$): A higher age of the mother was significantly associated with greater knowledge. Mothers in the age groups of 26-30 and 31-35 demonstrated better responses compared to those in younger age groups.

Religion ($\chi^2 = 12.145$, $p = 0.016$): A statistically significant association was identified between religion and the level of knowledge, indicating that religious background may influence awareness of malnutrition. It is recommended to implement culturally appropriate educational strategies.

Educational Qualification ($\chi^2 = 25.311$, $p = 0.013$): Higher education levels were significantly associated with better knowledge. Graduates, postgraduates and mothers who completed PUC/Diploma showed better responses than those with lower educational backgrounds.

Occupation ($\chi^2 = 13.075$, $p = 0.042$): Homemakers showed significantly better knowledge compared to working women.

Monthly Income ($\chi^2 = 9.874$, $p = 0.002$): Higher family income was significantly associated with better knowledge. Mothers with higher socioeconomic status possibly had better access to healthcare information.

No significant association was found between knowledge and variables such as type of family, area of residence, dietary pattern, and birth weight of the child.

These findings align with Kaur et al. (2019), who found that maternal education and family income were significantly related to better health knowledge regarding child care practices.

Knowledge Level Among Mothers

As depicted in the pie chart (**Figure 2**), half of the mothers (50%) had moderately adequate knowledge, followed by 35% who had adequate knowledge. About 15% had inadequate knowledge.

This distribution highlights a concerning gap, indicating that although **35% of mothers** demonstrated adequate knowledge (score 17–22), this proportion is not sufficient when it comes to a critical issue like child malnutrition. Ideally, all mothers should possess high levels of awareness about proper nutrition, feeding practices, signs of malnutrition, and preventive measures.

The fact that only **one-third** of the participants had adequate knowledge suggests that the remaining **65% are at risk of making uninformed decisions**, which can negatively impact their child's growth and development. This highlights a serious gap in community-level awareness and underscores the need for sustained, targeted health education programs.

This is consistent with findings from Singh and Gupta (2020), who reported that only a small percentage of mothers had satisfactory knowledge about child health promotion, immunization, and nutritional practices.

The low percentage of mothers with adequate knowledge stresses the need for structured education programs. Awareness initiatives, regular community health worker visits, and mother support groups could help bridge this knowledge gap.

While the findings of the present study are largely consistent with previous research, some variations can be noted. The relatively **higher proportion of mothers with only moderately adequate knowledge (50%)** and **adequate knowledge (35%)**, despite reasonable levels of general education and income, suggests that **formal education alone may not sufficiently enhance health-specific knowledge**. This gap emphasizes the importance of **targeted maternal and child health education programs** beyond school or college education.

Another point to consider is that the **lack of significant association with the type of family** might be influenced by changing social dynamics, such as the growing independence of women in decision-making, irrespective of family structure, a trend increasingly reported in **recent sociological studies**.

Additionally, although the study found a significant association between **religion and lower knowledge levels**, it must be noted that cultural beliefs and practices can sometimes override educational influences, highlighting the **complex interplay between tradition and health behaviours**.

Finally, compared to earlier studies, only **one-third (35%) of the mothers with adequate knowledge** underline an urgent need for **community-based interventions** tailored to bridge the knowledge-to-practice gap, particularly focusing on critical areas like **nutrition, preterm care, and immunization practices**.

These critical insights suggest that while age of the mother, education, and family income contribute positively, **holistic and culturally sensitive health education strategies** remain essential to truly empower mothers for better child health outcomes.

Conclusion

The present study identified significant associations between malnutrition knowledge and key demographic variables including education level, family income, area of residence, parity, and reproductive history among the mothers of Under Five Children attending Primary Health Center at Bettahalsur, Bangalore.

Implications

- **Nursing Practice:** The findings underscore the necessity of providing tailored nutritional counselling and health education based on the educational and socioeconomic contexts of the mothers of Under Five Children. Nurses should focus on personalized interventions, especially targeting populations from rural backgrounds and those economically disadvantaged, to enhance nutritional knowledge and healthcare outcomes effectively.
- **Nursing Education:** Nursing education programs must integrate comprehensive malnutritional knowledge as a core component. Curricula should be structured to include practical approaches for educating diverse populations, emphasizing culturally competent communication and effective knowledge dissemination strategies. Preparing nursing students through targeted educational experiences will enable them to address the specific needs of diverse maternal populations proficiently.
- **Nursing Administration:** The study emphasizes the critical role of nursing administration in creating and managing structured nutritional education programs within primary healthcare centres (PHCs). Administrative efforts should include strategic allocation of resources, continuous professional development opportunities, and regular training for healthcare providers. By addressing administrative gaps, healthcare services can bridge knowledge deficits identified in vulnerable populations and ensure sustained improvements in malnutritional knowledge.

- **Nursing Research:** These findings highlight a critical avenue for future nursing research. It encourages investigations into the effectiveness of various nutritional education interventions, their sustainability, and their long-term effects on maternal and child health outcomes. Expanding research to encompass broader demographic variables and diverse geographical locations can yield more generalizable insights and impactful policy recommendations.

Limitations

The study's relatively small sample size may limit the generalizability of findings. Additionally, the geographical confinement to Selected Primary Health Center (PHC), Bangalore, Bengaluru, restricts wider applicability. Data collection relied on a structured interview schedule, which might have introduced socially desirable responses. Furthermore, the study focused only on maternal knowledge and did not assess actual practices or the nutritional status of the children, which could have provided a more comprehensive understanding. Finally, time constraints restricted both the scope of data collection and the possibility of follow-up assessment.

Recommendations

- It is recommended to develop and implement extensive malnutrition education programs specifically designed for populations with lower socioeconomic status, rural communities, and multiparous mothers, addressing their unique barriers and educational needs.
- Future research should expand the scope to multiple geographical settings with larger, more diverse populations to enhance the robustness and generalizability of results, thus enabling broader applicability of findings to varied healthcare contexts.
- Longitudinal research is recommended to assess the lasting impact of nutritional education interventions, evaluating not only immediate knowledge gains but also long-term behavioural changes and improvements in maternal and child health outcomes.

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